

Immunity in early childhood in the pandemic peroid

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Abstract. Covid 19 cases are increasing both globally and nationally, so there is a need for prevention from each individual and recovery from each patients. Incident cases not only occur in adults but also in children. Cases or patients in children will be more difficult to handle. Prevention should be done by increasing the body's immune system is good. Improvement of the general system in children can be done by improving consumption patterns that contain macro nutrients and micro nutrients. Vitamins given to early childhood are better derived from foods compared to dietary supplements by regulating consumption patterns and adding variations in types and sources of food ingredients. A good immune system will be able to fight Covid 19 that enters the body thereby reducing the severity and risk of death. In addition to enhancing the immune system, maintaining a clean lifestyle and maintaining a social distance is also important to prevent the spread of Covid 19.

1. Introduction

Currently the world is being hit by a Covid 19 pandemic that has not yet ended, including the Indonesian state. Covid 19 is a type of coronavirus that attacked humans in 2003 that we identified with SARS, then followed by the emergence of other types of coronavirus namely Avian Influenza (2013), Swine Flu (2009) and MERS in 2013, until finally at the end of 2019 a new type of coronavirus called the coronavirus novel called Covid 19. Disease Covid 19 initially emerged from Wuhan, Hubei Province, China, then gradually spread to almost all countries in the world so that WHO established it as a Pandemic. Pandemic is a condition where a disease arises suddenly in a region and then spreads to various countries throughout the world. Covid 19 distribution data in the world until May 30, 2020, the largest in the American continent are 2,677,500 cases, the Erpa continent is 2,122,350 cases, in Southeast Asia 252.102 cases, Asia Pacific 180,446 cases and in Africa as many as 96,902 cases, with meningeal cases globally of 362,786¹.

ASEAN countries that have cases of Covid 19 patients are Indonesia, Thailand, Malaysia, Singapore, Vietnam, Cambodia and the Philippines. The number of positive cases in Indonesia on May 29, 2020 was 25,773 with a total death toll of 1.573². In Indonesia, the spread of coVid is increasingly expanding to 34 provinces, in other words there are no provinces that are free from coVid 19. In connection with this we must always be vigilant, and always carry out health protocols during this pandemic, so transmission can be minimized.

Based on field case findings, this virus can attack various ages, from toddlers until old people but patients with comorbidities such as hypertension and diabetes mellitus, male sex, active smokers, have a higher prevalence, patients with chronic liver cirrhosis have decreased immune system so that it is more susceptible to Covid-19.³ Some of the high risk factors that the Center for Disease Control and Prevention (CDC) have are close contact, including staying home with Covid-19 patients and a history of travel to the affected area. Being in one environment but not in close contact (within a 2 meter radius) is considered a low risk. Medical personnel is a high risk of contracting. In Italy, 9% of covid cases were^{4,5,6} medics and in China around 3,300 medics were also infected covid¹⁹. Medical personnel who are around the Covid Patients have a high risk of contracting as well as residents patients who feel in the red zone also have a higher risk of transmission compared to the green zone, as well as children in the red zone have a higher risk of transmission.

The immune system is a system of immune system that serves to prevent and fight za tasing which can harm the body. The role of the immune system is very important to maintain the health and protection of harmful substances from outside the body. A weakened immune system causes bacteria or viruses to infect the body so easily that it can cause disease. The most common

infectious disease in children is Upper respiratory tract invasion (ISPA). According to WHO 2011, the number of children experiencing ARI is 48,325, it is estimated that 30-70% of developing countries are higher compared to developed countries⁷. In 2016, WHO estimated ARI in developing countries at the age of five with 15% -20% death per year. According to the 2013 Riskerdes, it showed that the prevalence of ARI in Indonesia reached 25.5%, and the results of Riskerdes in 2016 the prevalence of ARI was still 25%⁸. This shows that the chances of a viral infection in children are very high, as does Covid 19 which can attack toddlers. According to the Covid Task Force 19 handling committee stated that the risk of death in children is as great as the risk of death of patients aged 50 years and over. As per data 18 May 2020 the number of children who confirmed positive covid 19 in Indonesia was 584 and the death rate from the Covid 19 virus was very high⁹.

Preparing the immune system (immunity) is one of the efforts in controlling or preventing the covid 19 virus attack, in addition to social distancing appeals. This preparation of immunity is not only in adults but also in early childhood, thus preventing the occurrence of cases in Early Childhood

2. Method

This paper is a review of various domestic and foreign literature from 2000 to 2020. Data processing is carried out with the synthesis of several literatures. The literature used is in the form of a journal about the latest research related to the Covid 19 incident that occurred throughout the world and relates to the Covid incidence rate in children and the immune system in children, textbooks about increasing infant immunity and statistical data on Covid 19 incidence rates in the World and in Indonesia from the mass media

3. Result and Discussion

Immune System

The immune system is the body's ability to fight infection, eliminating the action of toxins and other virulent vectors that are antigenic and immunogenic. Antigen is a substance or compound that can stimulate antibody formation. Antigenic is the nature of a compound that can stimulate the formation of specific antibodies to the compound. If the immune system is weakened, the ability to protect the body is also reduced so that pathogens including viruses can grow and develop in the body. The reaction given by the body's cells to viruses or bacteria that enters is called the immune system^{9,10,11}.

The immune system plays an important role in protecting us from viral infections, germs / bacteria and other foreign objects that enter the human body. In everyday life we live side by side with viruses and germs. Germs that are scattered around us can enter the body through air or food, but our immune system can keep the body protected. The process of the formation of the immune system is most important starting from the beginning of birth until the age of 1 year.

The following is an immune system response function firstly is defense: defense functions involving defense against antigens from outside the body such as the invasion of microorganisms and parasites to the body. There are 2 possibilities that occur from the results of the resistance of the virus and the immune system, namely the body is free and remains healthy if the immune system wins or the body suffers pain if the microorganisms from outside win. Secondly, homeostation: to meet the general requirements of all multicellular creatures, namely the formation of new cells from the body, so that the normal process of catabolism and degradation occurs so that damaged cellular elements from the body can be removed. Third Standing: The function of the stalling involves the perondaa of a part of the body primarily intended to monitor the recognition of cells that turn into apnormal through a mutase process. Cell changes occur spontaneously or can be induced by certain chemicals, radiation or viral infections. The immune function of the immune system is tasked to always be alert and aware of changes and subsequently quickly dispose of new configurations that arise on abnormal cell surfaces^{10,12}. Automatically the body will respond to every viru or bacteria that enters the body, if the body's response cannot maintain the immune system, it will intensify pain. To keep the body healthy and able to fight disease, it is necessary to have an immune system connected. There are several factors which can affect the quality of the human immune system.

Factors that affect the immune system¹²: Metabolik Factor is some hormones in our body can affect the body's immune response, for example hypoadrenal and hypothyroidism will result in decreased body resistance to infection. Likewise, people who get steroids are very susceptible to bacterial or viral infections. Genital hormones that belong to a group of steroid hormones, such as androgens, esters and progesterone, are three factors that alter the immune system. This can be seen from the difference in the prevalence of sufferers between men and women with certain immune diseases. Enviroment Factor is increased morbidity of infectious diseases, often occurs in people with less standard of living and less hygiene. The increase may be caused by more exposure to germs or loss of endurance caused by unbalanced pliers consumption patterns. Nutrition Factor, A person's nutritional condition is very influential on a person's immune status. The body needs six basic components of food that are used for growth and maintenance of body health. The six components of nutrition include: protein, carbohydrates, fats, vitamins, minerals and water. Adequate nutrition in accordance with needs is very important to form the body's immune system normally. Anatomy Factor, the first line of defense in the face of microbial invasion is the skin and the lining membrane that lines the surface of the body. The structure of the network acts as a natural immunity by providing a physical and effective barrier. Any damage to the surface of the skin or the lining of the lenders, will facilitate the onset of disease. Fisiologis Factor, gastric acid generally causes an unfavorable environment in pathogenic bacteria. Similarly, normal urine will flush the urinary tract, thereby reducing the possibility of infection by bacteria. In the skin also produced substances that are bactericidal. In Sarah there are a number of protective substances that react non-specifically so that it can deactivate bacteria or viruses. Age Factor, the development of the immune system begins in the womb, so the effectiveness also starts from a weak state and increases with age. Even so it does not mean at an advanced age, the immune system will work optimally, but on the contrary the immune function in the elderly begins to decrease compared to younger people, even though there is no disruption in the formation of the immune system. This is not only due to biological setbacks, but also generally related to the shrinking of the thymus gland. This situation will affect the response of cellular and humoral immune systems. At the age of age the risk of sharing disorders that involve the immune system will increase, for example the risk of getting an autoimmune disease. Mikroba factor, the development of microbial colonies that are not pathogenic on the surface of the body abik outside or inside the body will affect the immune system. For example, normal flora that grows on the body can help inhibit the growth of pathogenic bacteria. Antibiotic treatment without the right procedure can kill normal flora and vice versa can fertilize the growth of pathogenic bacteria.

Relationship Covid 19 and Immunity

One of the prevention of Covid 19 is to prepare a good immune system, so that the body will win against Covid 19. There are various efforts from various literatures that can improve the body's resistance to infection. Stop smoking can reduce respiratory tract infections. Smoking can reduce the protective function of airway epithelium, alveolar macrophages, dendritic cells, NK cells and the adaptive immune system. Smoking can reduce microbial virulence and antibiotic resistance¹³. Alcohol consumption is associated with an increased risk of community pneumonia. Consumption of algae can reduce the function of neutrophils, leukocytes, airway cilia and macrophac alveoli¹⁴ thereby increasing the risk of Covid 19. Sleep deprivation can also have an impact on immunity. Sleep deprivation is associated with an increased susceptibility to infection, which makes a person susceptible to the virus¹⁵⁾¹⁰.

To reduce infection, the body's immune system must be intentionally made strong. Every time you contract a disease, your body is no longer in shape so that the effort to maintain your body is an important part of maintaining good health. Only a fit body is not susceptible to disease, including various types of infections. From some covid case studies that have been carried out, it shows a significant relationship between the severity of the disease and the level of proinflammatory syntokin played by the immune system¹⁵. The immune system plays an important role in the prevention or healing of all types of viruses such as Covid 19, therefore creating good immunity especially for young children is very important as an effort to prevent the virus. If a child suffers from illness, the energy that should be used for cell growth and logging will be used for the

process of forming the immune system and healing, so that it will interfere with the child's growth process.

Increase Immune System for Childhood

The incidence of Covid 19 cases in children has also occurred in Indonesia, but the exact number has not been reported with certainty the reality is that the child infection with Covid 19 happened, so prevention efforts are needed as best as possible. Medical personnel will have difficulty if the number of covid patients in children increases, it is because isolating and caring for pediatric patients without parents will be difficult in conditioning children. The most fundamental thing in improving a child's immune system is to improve the quality of nutritional intake, as explained above that nutritional intake can increase the body in the formation of the body's immune system

When the baby have early age (0-12 months) is a period that is very susceptible to viruses or bacteria. One effort that can be done is to provide immunity from an early age by giving exclusive breastfeeding, namely giving milk from the age of 0-6 months. Breast milk is first and foremost and the best for natural babies. Asi contains various types of nutrients needed in the process of growth and development. Breast milk can increase the baby's immune system including reducing the risk of infection, for example respiratory tract infections, digestion and diarrhea¹⁶. This is in line with research conducted by WiwikUtami (2014), that toddlers aged 1-3 years given exclusive breastfeeding have an immune system better than toddlers given exclusive breastfeeding¹⁷.

Malnutrition can affect the immune system, the immune system functions as a basis for self-protection from the body to fight viruses / bacteria. Imbalance of consumption of macro nutrients (carbohydrates, proteins and fats) and micronutrients (vitamins and minerals) will trigger disruption in the functioning of the immune system that can occur¹⁵. Vitamins are organic components that are needed in small amounts but are very important in metabolic reactions in cells, and are needed for normal growth and health maintenance. One important role of vitamin and mineral is to maintain the body's immunity¹⁸. Most of the vitamins and minerals cannot be fulfilled by the body, so external intake is needed especially from vegetables, fruits and animal foods. To meet the needs of vitamins and minerals requires a variety of food consumption and also in accordance with its portion. Under certain conditions nutritional intake can not be fulfilled by the food consumed, it can be fulfilled from supplements but the use of supplements must be in accordance with the advice of a bacterium or nutritionist, because use in a long period of time can have side effects. Nutrition-prone groups that require additional supplements are the elderly, children, low economic groups, refugees, residents in emergencies and women of childbearing age.

Not only does it help the process of metabolism of nutrients, vitamins and minerals it also functions as an antioxidant that affects the quality of human life¹⁹. The following are food sources needed to improve the body's immune system: Protein and the immune system, studies have shown that deficiency of high quality protein can result in depletion of immune cell, inability of the body to make antibodies and other immune related problem. High quality to complete protein are found from may resource are egg, fish and shellfish, tofu, tempeh and quinoa. May vegetable and grain are also excellent source are broccoli, brown rice, nut butter, mushroom, nuts and seeds. Fiber and immune system, whole fresh fruit and vegetable promote a healthy gastrointestinal system. Fiber promote the removal toxins that xanadversey affect your gastrointestinal tranct cells and support healthy digestive function. Vitamin B for healthy immune system. The source of vitamin B complex is whole grains, vegetables and fruits, crimini mushroom, red bell peppers, sardine, salmon, tuna, cod, lamb, scallops, shrimp, and beef. Vitamin C support a decrease in the leght of time and severity of system associated with upper respiratory viral infection, promote phagosytic cell functions and support healty T-cell function, provies antioxidant activity to support healing at sites of inflamtion. Source of vitamin C is citrus, broccoli, kale, bok coy, beet greens, collard greens, swis chard, asparagus. Vitamin A,E,K for healthy immune system. The source of vitamin A and E is turnip greens, swis chard, mustard greens, pro vitamin A carotenoid (leafy greens, carrots, sweet potatoes, winter squash, asparagus, bok choy). Source of vitamin K is cauliflower, green vegetable such as spinach and asparagus. Mineral to support immune system is iron and cooper, cooper deficiency is associated with an increase in infection and may impair development cells of immune system. The source of copper is sesame seeds, cashews, saybeans, mushrooms, beet greens, spinach, asparagus, swis chard, mustard greens, kale. Iron deficiency results in impaired response

to antibody and deficiency phagocytic cell function. The source of iron is spinach, swiss chard, cumin, turmeric, beet greens, collard greens, bok choy, asparagus, leeks, romaine lettuce. Zinc for healthy immune system. The source of zinc is spinach, asparagus, shiitake mushrooms, crimini mushrooms, sesame seed, pumpkin seed, garbanzo beans, lentils, cashews, quinoa. Herb to support immune system are cinnamon, garlic, ginger, turmeric

Parents can meet the source of vitamins and minerals well but not necessarily the child can meet, because most of the problems with eating in children are not like eating fruits and vegetables. This can be solved by giving vitamin supplements. But supplementation for a long time can have side effects on the body and in children can result in a consumption pattern that does not like fruits and vegetables to adulthood. Therefore fulfilling the intake of nutritional sources of vitamins and minerals in a good child is to get used to the consumption of diverse foods every day. Habit can be done slowly by explaining little by little the function of food consumed and using a variety of processing so that children do not get bored quickly

4. Conclusions

The high case of infection in children which reaches 25% makes children as a high-risk group and the risk of death in children the same as adults over the age of 50 years, therefore it is necessary to do earlier prevention, prevention should be done by improving the system a good immune system, in addition to the immune system is also a clean lifestyle and keep social interaction distance.

5. References

- [1]. World Health Organization. Naming the coronavirus disease (COVID-19) and the virus that causes it [Internet]. Geneva: World Health Organization; 2020 [cited 2020 May 30] https://covid19.who.int/?gclid=CjwKCAjwiMj2BRBFEiwAYfTbCh18alqUwuFzOSN53ByZ5pUIx5ATEyIS4d4mcK-M438xN8Kuxw9RNBoCVyMQAvD_BwE
- [2] Harian Kompas (internet). Jakarta. 2020sitasi tanggal 30 Mei 2020 <https://www.kompas.com/tren/read/2020/04/19/071600465/update-covid-19-di-dunia-19-april--2-3-juta-kasus-595.467-semuh-160.434>
- [3] Susilo Adityo, dkk. Coronavirus Diseases 2019: Tinjauan Literasi Terkini. Jurnal Penyakit Dalam. 2020 Vol 7 No 01 (45-67)
- [4] Prevention CfDCA. Interim US Guidance for Risk Assessment and Public Health Management of Persons with Potential Coronavirus Disease 2019 (COVID-19) Exposures: Geographic Risk and Contacts of Laboratory-confirmed Cases [Internet]. 2020 [updated 2020 March 7; cited 2020 March 20]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/php/riskassessment.html>
- [5] International Council of Nurses. High proportion of healthcare workers with COVID-19 in Italy is a stark warning to the world: protecting nurses and their colleagues must be the number one priority. Geneva: International Council of Nurses; 2020
- [6] International Council of Nurses. High proportion of healthcare workers with COVID-19 in Italy is a stark warning to the world: protecting nurses and their colleagues must be the number one priority. Geneva: International Council of Nurses; 2020
- [7] WHO. 2016. AngkatKematian dan Kelahiran di Negara berkembang.
- [8] Kemenkes RI. Riskerdas 2016. Penyakit yang DitularkanMelalui Udara. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Departemen Kesehatan Republik Indonesia.
- [9] VOA Indonesia, 2020 <https://www.voaindonesia.com/a/tingkat-kematian-anak-indonesia-akibat-covid-19-tertinggi-di-asean/5441432.html>. Cited 30 Mei 2020
- [10]Wang J, Zhou M, Liu F. Exploring the reasons for healthcare workers infected with novel coronavirus disease 2019 (COVID-19) in China. J Hosp Infect. 2020; published online March 5. DOI: 10.1016/j.jhin.2020.03.002.
- [11]Siswanto, dkk. Peran BeberapaZatGizidalamImunitas. GiziIndon 2013, 36(1): 67-64
- [12]Bagus Ida. 2017. SistemImun. FakultasKedokteranHewanUniversitasUdayana.
- [13] Simet SM, Sisson JH. Alcohol's Effects on Lung Health and Immunity. Alcohol Res. 2015;37(2):199-208

- [14] Ibarra-Coronado EG, Pantaleon-Martinez AM, Velazquez-Moctezuma J, Prospero-Garcia O, Mendez-Diaz M, Perez-Tapia M, et al. The Bidirectional Relationship between Sleep and Immunity against Infections. *J Immunol Res*. 2015;2015:678164.
- [15] TufanAbdulahman, dkk. Covid-19, Immune System, Hyperinflamsi and Repurposing Antiheumatic Drugs. *Turkis Journal of Medical Sciences*.2020.50 :1-13 doi:10.3906/sag-2004-168
- [16] Prasetyono DS, 2009. Buku ASI Eksklusif. Diva Press: Yogyakarta
- [17] UtamiWiwik dkk.2014. PerbedaanImunitasBalita (Usia 1-3 tahun) yang diberikan ASI Eksklusif dan TidakDiberikan ASI Eksklusif.
- [18] Calder Philidp C dan Kew Samatha. The Immune System: a Target For Functional Food. *British Journal Of Nutrition*. 2002:88,S165-S176
- [19] Feldman C, Anderson R. Cigarette Smooking and Mechanisms of susceptibility to Infection of the Respiratory Tract and Other Organ System. *J Infect*.2013:67(3):169-184